AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Previously Presented) A system for use in the detection or measurement of at least one characteristic relating to a chemical environment, the system comprising:

an optical fiber arranged to receive light from an optical source;

the system being adapted to let a gas derived from said chemical environment diffuse into the optical fiber thereby altering the optical properties of the optical fiber, so that changes in the optical properties of the optical fiber due to the in-diffusion of said gas can be determined by optical signal detection and signal analyzing means for deriving from the determined changes at least one characteristic value representing the chemical environment.

2. (Original) A system according to claim 1, comprising reaction elements or catalysts adapted to react or interact with constituents of the chemical environment so as to create said gas.

3. (Previously Presented) A system according to claim 2, wherein the reactive elements or catalysts are added to or on the outside of the fiber coating of the optical fiber.

4. (Previously Presented) A system according to claim 2, wherein the reactive elements or catalysts are added to or on the outside of a tube element provided for protection and packaging of the optical fiber.

5. (Previously Presented) A system according to claim 2, wherein the one or more reactive elements or catalysts comprises metals.

6. (Previously Presented) A system according to claim 2, wherein the one or more reactive elements or catalysts comprises elements capable of undergoing a chemical reaction, such as a corrosion process, thereby generating said gas.

7. (Currently Amended) A system according to claim [[6]] 35, wherein the one or more reactive elements or catalysts comprises iron, the iron generating said gas, whereby a value representing the ingress of water and the start of a corrosion process can be derived from the determined changes.

8. (Currently Amended) A system according to claim [[6]] 35, wherein the metal elements comprises zinc, the zinc generating said gas, whereby a pH-value representing the chemical environment can be derived from the determined changes.

9. (Currently Amended) A system according to claim [[5]] 35, wherein the metal elements comprises magnesium, in order to enable the detection or measurement of carbon dioxide by detection or measurement of the hydrogen formed during a reaction process including the carbon dioxide and metal elements.

10. (Currently Amended) A system according to claim [[6]] 35, wherein the metal elements comprises zinc, in order to enable the detection or measurement of hydrogen sulfide by detection of the hydrogen gas formed in a reaction process including the hydrogen sulfide and the metal elements.

11. (Previously Presented) A system according to claim 1, wherein the in-diffusion of said gas causes an additional loss in the light transmitted in the optical fiber.

12. (Previously Presented) A system according to claim 1, wherein the change in the optical properties of the optical fiber is enhanced by suitable dopants in the fiber.

13. (Previously Presented) A system according to claim 1, wherein the fiber is coated with a coating comprising a material with high diffusivity to the gas.

14. (Original) A system according to claim 13, wherein the coating comprises polymers with high diffusivity to gas.

15. (Previously Presented) A system according to claim 1, further comprising inlet means arranged to allow a sample or part of the chemical environment to enter the system.

16. (Previously Presented) A system according to claim 2, wherein the one or more reaction elements contribute to the galvanic protection of metal armoring.

17. (Previously Presented) A system according claim 1, wherein the gas is hydrogen.

18. (Previously Presented) A system according claim 1, further comprising a light source for launching light into the optical fiber.

19. (Previously Presented) A sensor system comprising a system according to claim 1, and optical signal detection and signal analyzing means adapted to determine said changes in the optical properties of the optical fiber and to derive from the determined changes said at least one characteristic value.

20. (Previously Presented) A sensor system according to claim 11, further comprising optical transmission measurement means for obtaining a measure of the additional loss by measuring the transmission loss of the optical fiber.

21. (Previously Presented) A sensor system according to claim 11, comprising optical measurement means for determining the magnitude and location of the additional losses along the fiber.

22. (Original) A sensor system according to claim 21, wherein the optical measurement means comprises an OTDR (Optical Time Domain Reflection) apparatus.

23. (Previously Presented) A sensor system according to claim 20, further comprising optical measurement means for measurement of at least two optical wavelengths, the first optical wavelength being within an absorption peak caused by the gas, the second optical wavelength being outside the absorption peak caused by the gas,

the sensor system further comprising comparison means for comparing the measurements at said at least two wavelengths in order to compensate for losses caused by mechanisms other than in-diffusion of the gas.

24. (Previously Presented) A sensor system according to claim 23, wherein the comparison means is arranged to compensate for losses caused by bending of the fiber.

25. (Previously Presented) A sensor system according to claim 23, wherein the first peak is at 1244 nm and the second peak at about 1300 nm.

26. (Previously Presented) A sensor system according to claim 19, wherein the optical fiber comprises one or more FBG (Fibre Bragg grating)-elements, the Bragg wavelength of the Bragg grating(s) depending on the in-diffusion of said gas, and wherein the optical detection and signal analyzing means comprises means for measuring the shift of the reflected Bragg wavelength of at least one of the FBG elements due to the in-diffusion of said gas.

27. (Original) A sensor system according to claim 26, comprising means for compensating for wavelength changes caused by mechanisms other than in-diffusion of the gas.

28. (Original) A sensor system according to claim 27, wherein the compensating means is arranged to compensate for temperature changes.

29. (Previously Presented) A sensor system according to claim 27, wherein at least two FBGs are provided, and the compensating means is arranged to measure the reflected Bragg wavelengths of the at least two FBGs, wherein at least one FBG is exposed to the gas and at least one other FBG is protected from the gas.

30. (Original) A sensor system according to claim 29, wherein a carbon layer is provided for protection of said other FBG.

31. (Previously Presented) A sensor system according to claim 29, wherein the at least two FBGs are closely spaced.

32. (Previously Presented) A detection or measurement assembly for use with a system of claim 1, the assembly comprising:

optical signal detection and signal analyzing means arranged to determine changes in the optical properties of the optical fiber due to the in-diffusion of the said gas, and to derive from the determined changes at least one characteristic value representing the chemical environment.

33. (Previously Presented) Use of a system, a sensor system or an assembly according to claim 1 as a sensor for monitoring at least one of the corrosion and~~/or~~ the environmental conditions of flexible risers in offshore environments.

34. (Previously Presented) A method of detecting or measuring at least one characteristic relating to a chemical environment, comprising:

launching light into an optical fiber;

letting a gas derived from the chemical environment diffuse into the optical fiber, thereby altering the optical properties of the optical fiber;

detecting and analyzing light from the optical fiber so as to determine changes in the optical properties of the optical fiber due to the in-diffusion of said gas; and

deriving said at least one characteristic value representing the chemical environment from the determined changes.

35. (New) A system according to claim 2, wherein the one or more reactive elements or catalysts comprises elements capable of undergoing a chemical reaction, such as a corrosion process, thereby generating said gas, the elements comprising at least one of zinc, magnesium, and iron.